1. The authority, organization, and infrastructure of the veterinary services organization in the region

- What veterinary force is available in the region for carrying out regulatory programs for livestock diseases?

Major veterinary services responsible for the prevention and control of livestock diseases are the Animal Health Division of the Ministry of Agriculture and Forestry (MAF), National Veterinary Research and Quarantine Service (NVRQS), and Provincial Veterinary Services. Their activities are supported by Livestock Health Control Association, National Agricultural Cooperative Federation and the Korean Veterinary Medical Association.

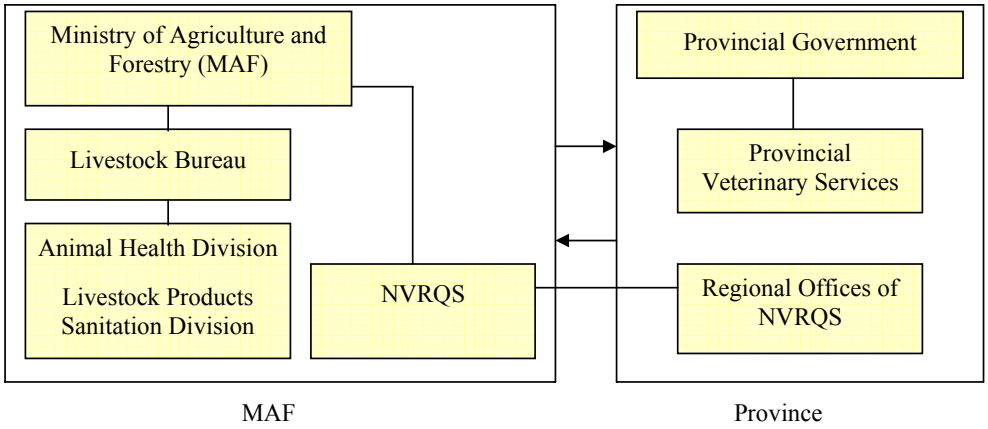

Fig. 1 National and provincial veterinary services involved in the prevention and control of livestock diseases

Animal Health Division is a part of the Livestock Bureau under the MAF. The main tasks include the implementation of the Veterinarian Law and Pharmacist Law (for animals), inspection of imported and exported animals or livestock, enforcement of the Domestic Animal Contagious Disease Prevention Law, and the prevention and eradication of domestic animal diseases. Livestock Products Sanitation Division, also under the Livestock Bureau, is responsible for the application of the Livestock Sanitation Process Law, and the establishment and promotion of meat sanitation composite measures.

NVRQS is an executive agency of the MAF, with the headquarters located in Anyang, and 5 regional and 15 district offices located across the country. Its main tasks are the prevention and control of major animal diseases, quarantine inspection, livestock product safety and veterinary research.

Each of Korea's 9 provinces and 7 cities has its own veterinary service, which is responsible for the prevention and control of major animal diseases, meat and milk hygiene, and animal welfare within their authority. These services include the National Livestock Research Institute and the animal health laboratory.

These veterinary services work closely for the common goal of prevention and control of animal diseases, and promotion of animal health and sanitation in Korea.

- Are all officers veterinarians?

Mostly, the officers who are working in veterinary services are veterinarians. But, there are also other animal health staff specialized in livestock management or animal diseases. Table 1 shows the numbers and categories of veterinarians and other animal health staff in Korea.

Veterinarians		
Central government	548	
MAF	17	
NVRQS	531	Including border veterinarians
Provincial government	679	
Provincial offices	76	
Animal health labs.	603	
Local office(Si,Gun,Gu)	203	
Auxiliary personnel		
Animal health assistants	458	
Animal health auxiliaries	1,077	
Food hygiene and meat inspectors		
Veterinary inspectors	591	
Meat inspectors	130	
Private veterinary practitioners	3,258	Total number of qualified veterinarians in Korea: 9,039

Table 1. Number of veterinarians and other animal health personnel, 2005

- What are the required procedures for specimen collection?

Specimen collection **is** performed according to the FMD control guidelines.

- The relevant veterinary officials from NVRQS are exclusively authorized to collect sample**s**, conduct postmortem procedures and start epidemiological investigation**s** to prevent the spread of infection.

○ Handling of specimens

- The animals need to be restrained properly to avoid injury of the personnel collecting samples as well as for animal welfare reasons.

- At least, 3 herds of animals are sampled for laboratory diagnosis. All the specimens except the blood for serum-isolation should be kept within ice until received by the laboratory.

· Vesicular fluid : vesicular fluid, if possible, should be collected by using a 2-5ml syringe

· Epithelial tissues : 1g of epithelial tissue should be collected from a lesion and placed in a transport medium composed of equal amounts of glycol and 0.08M phosphate buffer Ph 7.2 ~ 7.6. If 0.04M phosphate buffer is not available, tissue culture medium or phosphate buffered saline**,** preferably added with antibiotics**,** can be used

· Whole blood : Collect 10ml of blood using the test tube added with anticoagulants such as EDTA or heparin

· Serum : collect 20ml of blood and isolate the serum followed by coagulation

- What diagnostic procedures and techniques are routinely followed for each disease agent of concern?

Laboratory tests for FMD viral antigen detection is conducted by Ag ELISA, RT-PCR, DNA sequencing and viral-isolation, while antibody detection is conducted by LPB ELISA, 3 ABC ELISA and VN test, as specified in the FMD diagnostic method of OIE.

	Test	Method
Antibody test	Liquid Phase Blocking(LPB) ELISA	WRL Pirbright UK
	3 ABC ELISA	FADDL USA, Brecia Italy
	Virus Neutralization	Using IBRS-2 cells
Antigen test	Virus Isolation test	Using black goat detal lung(BGFL)
		Primary cell culture, IBRS-2, BHK/20
	RT-PCR	Using primers for 3ABC and VPI region
	Antigen ELISA	WRL Pirbright UK

Table 2 Tests employed to diagnose FMD in Korea

- What laws, regulations and policies are in effect(copies should be provided, English translation required)?

Act for Prevention of Livestock Epidemics (Annex 1.) and FMD Control Guidelines prescribe the necessary diseases which should be under control and their preventive measures such as notification of suspicious cases, stamping-out, movement controls, disinfection, vaccination, surveillance, importation quarantine, disposal, compensation, and penal provisions.

- **What security measures are in place at ports of entry to control importation of materials that might carry disease agents of concern?**

The Act for Prevention of Livestock Epidemics describes the necessary measures for importation and exportation of livestock and livestock products. Under the Act for Prevention of Livestock Epidemics, livestock and livestock products are imported mainly through the 8 designated international airports and 13 ports where they are inspected by animal quarantine officers from the NVRQS.

○ **Animals :** The Act for Prevention of Livestock Epidemics prohibits the importation of cloven-hoofed animals from countries with major livestock epidemics such as FMD.

○ **Meat(s) and other animal products (milk, meat products) :** The Act for Prevention of Livestock Epidemics prohibits the importation of meat and meat products of cloven-hoofed animals from countries with major livestock epidemics such as FMD.

○ **Genetic material (semen and embryos) :** The Act for Prevention of Livestock Epidemics requires exporting countries to verify whether or not semen and embryos originated from countries without major animal diseases such as FMD, and whether or not cases of FMD, rinderpest, contagious bovine pleuropneumonia and BSE have been reported in the exporting country.

○ **Biologics :** Under the Act for Prevention of Livestock Epidemics, importation of biologics for animal use requires the approval and permission of MAF.

○ **Animal health requirements for straw and forage :** In accordance with the Act for Prevention of Livestock Epidemics Article 23 and the Ministrial Ordinance of the same Act**,** Article 16**,** Animal Health Requirements for Straw and Forage**,** exported into the Republic of Korea**,** was established.

It requires the straw and forage to have been produced and stored within the 50km radius area, which have been free from FMD for the past 2 years, Rinderpest and African swine fever for the past 3 years.

Other major requirements are as follows:

Straw and forage shall have been kept clean and shall not have been tainted or contaminated with excretion, secretion and other materials derived from cloven-hoofed animals in the process of production, packing and storage.

Straw and forage should have been either steamed for at least 10 minutes at a minimum temperature of 80℃ in an air-tight chamber or processed with formaldehyde fumes of 35-40% formalin solution in a chamber kept closed more than 8 hours at a minimum temperature of 19℃ prior to packing.

Facilities for heat treatment or disinfection has to be recognized by the Korean government.

Treatment of international garbage

Act for Prevention of Livestock Epidemics requires garbage from ships and airplanes in international service to be disinfected with sodium carbonate or sodium sulfate and incinerated by a licensed company.

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2. Disease status, i.e is the restricted disease agent known to exist in the region? If yes, at what prevalence? If no, when was the most recent diagnosis?

- For each relevant hazard, is the pest or disease agent known to exist in the region?

No

- When was the most recent diagnosis or detection?

The most recent FMD occurred in 23 June 2002.

- What breeds or species were affected?

Pig, Cattle

- How many cases were diagnosed and reported?

A total of 16 cases (15 pigs and one cattle) were confirmed with FMD between 2 May and 23 June.

Farm No.	Location (Province)	Location (County)	Farm type	No. of Livestock	No. affected/ deaths	Date reported	Lab diagnosis	Date of slaughter
1	Kyonggi	Anseong	Pig	8,302	500/280	2 May	4 May	3-4 May
2	Chungbuk	Jincheon	Pig	1,006	50/1	3 May	4 May	4-5 May
3	Kyonggi	Yongin	Pig	1,423	8/7	10 May	11 May	10 May
4	Kyonggi	Yongin	Pig	11,035	8/7	10 May	11 May	10-11 May
5	Kyonggi	Anseong	*Pig/Cattle	162/116	1/0	10 May	11 May	11-12 May
6	Kyonggi	Anseong	*Pig/Deer	4,009/9	4/0	10 May	11 May	11-13 May
7	Kyonggi	Yongin	Pig	301	18/0	12 May	13 May	12 May
8	Chungbuk	Jincheon	Pig	17,380	3/0	12 May	13 May	12-15 May
9	Kyonggi	Anseong	Pig	1,048	2/1	18 May	19 May	19 May
10	Kyonggi	Anseong	Pig	996	16/0	19 May	19 May	19-20 May
11	Kyonggi	Yongin	Pig	2,687	1/0	19 May	20 May	19-21 May
12	Kyonggi	Anseong	Pig	3,181	2/1	19 May	20 May	20-21 May
13	Kyonggi	Pyeongtaek	Pig	1,552	30/1	2 June	3 June	2-3 June
14	Kyonggi	Anseong	Dairy cow	78	1/0	7 June	8 June	7-8 June
15	Kyonggi	Anseong	Pig	5,494	13/9	10 June	11 June	11-14 June
16	Kyonggi	Anseong	Pig	3,578	6/3	23 June	24 June	24 June

* Only pigs were affected

Table 3. FMD outbreaks in Korea between May-June 2002

- If the pest or disease agent was present and subsequently eradicated, what methods were used for eradication?

FMD was eradicated in Republic of Korea.

In response to the outbreaks, Korean animal health authorities implemented a range of control measures including stamping-out of animals in infected and neighbouring farms, strict movement controls,

disinfection activities, epidemiological investigations and surveillance in accordance with the Exotic Animal Disease Control Guidelines and FMD Emergency Standard Operating Procedures (SOP), a detailed manual that describes the required emergency measures in the event of an FMD outbreak.

With the confirmation of the FMD outbreak, emergency headquarters and an emergency FMD control center were established at MAF and NVRQS, respectively to plan and coordinate emergency operations. Provincial emergency control centers were also established to quickly implement necessary control measures.

Throughout the outbreak, emergency meetings**,** attended by MAF, NVRQS, veterinary experts and livestock-related associations**,** were held to decide on the details of the control strategy. The decision**,** not to use emergency vaccinations and the use of pre-emptive culling**,** was made through these meetings.

- What geographic and environmental characteristics of the exporting region may influence the prevalence of the pest or disease agent?

The Republic of Korea (ROK) is located on the eastern part of the Asian continent, at the northwestern corner of the Pacific Ocean. ROK is mostly surrounded by the sea and the only side it shares its land border is with the Democratic People's Republic of Korea (DPRK). The border is heavily guarded by the militaries of each side, making it impassable. These characteristics make the ROK virtually an island accessible only by air or sea. Neighboring countries of the Korean peninsula (the ROK and DPRK) include Japan, China, Russia and Mongolia, which all, in recent years, reported outbreaks of FMD. These outbreaks demonstrate the need for increased cooperation and coordination among the regional countries.

3. The status of adjacent regions with respect to the agent

- For each relevant hazard, is the pest or disease agent known to exist, or has it existed previously, in any region adjacent to the region proposing the trade?

The Republic of Korea prohibits importation of all the susceptible animals and animal products from FMD outbreak countries such as the People's of Republic China and the Democratic People's Republic Korea.

- If yes, at what prevalence?

There aren't any exact information on FMD outbreak of China(People's of Rep.) and North Korea(as referred to OIE).

- Are there any relevant factors about the adjacent regions that should be taken into account?(e.g., size, distance from adjacent border to affected herds or animals)

ROK is mostly surrounded by sea and the only side it shares its land border is with is the Democratic

People's Republic Korea(DPRK). The border is heavily guarded by the militaries of each side, making it impassable.

4. The extent of an active disease- control program, if any, if the agent is known to exist in the region

- What is the extent of active disease-control program, if any, if the pest or disease agent is known to exist in the region, or recently existed is the region?

Currently, Republic of Korea is free from FMD since 2002.

In response to the outbreaks in 2002, Korean animal health authorities implemented a range of control measures including stamping-out of animals in infected and neighboring farms, strict movement controls, disinfection activities, epidemiological investigations and surveillance in accordance with the Exotic Animal Disease Control Guidelines and FMD Emergency Standard Operating Procedures (SOP), a detailed manual that describes the required emergency measures in the event of an FMD outbreak.

With the confirmation of the FMD outbreak, emergency headquarters and an emergency FMD control center were established at MAF and NVRQS, respectively to plan and coordinate emergency operations. Provincial emergency control centers were also established to quickly implement necessary control measures.

Throughout the outbreak, emergency meetings**,** attended by MAF, NVRQS, veterinary experts and livestock-related associations**,** were held to decide on the details of the control strategy. The decision**,** not to use emergency vaccinations and the use of pre-emptive culling**,** was decided through these meetings.

- What epidemiological investigations are done to trace the source of infection?

After the 2000 FMD outbreak, the importance and the need**s** to improve epidemiological investigation capabilities **were** quickly recognized. Based on these needs, on 31 December 2001, the epidemiology division was newly established at the NVRQS.

On May 2002, soon after the first FMD outbreak in Anseong, Kyonggi province, a central epidemiological investigation team and epidemiological investigation committee were organized and operated. These organizations, along with the epidemiology division, were responsible for the investigation of the source and transmission of the 2002 FMD outbreak.

From 27 June to 4 July 2002, an International Epidemiology Assessment Team, comprised of epidemiology experts from Australia, New Zealand and USA, was invited to assess the FMD situation in the Republic of Korea, share their views on the possible source of the virus and the effectiveness of the control program, and make recommendations for the future prevention and control of the disease.

The possible routes of FMD introduction that has been investigated are foreign workers working at the index or neighboring farms who had contact with their relatives or friends, overseas travelers, swill, imported sawdust, wild birds and air-borne transmission.

1. Foreign workers

At the time of the FMD outbreak, there were two foreign workers on the index farm, but a total of nine workers had been working from March, during the period of possible viral-introduction.

These foreign workers were living mostly on the farm and it was confirmed that they met their friends on the weekends or holidays. Although, there were no direct evidence that the foreign workers had transmitted the disease, the foreign workers would generally meet at a regular place to share news and traditional food(s).

2. Overseas travelers

According to investigation of travel records, it was confirmed that nearby farmers in Anseong had visited foreign countries during 23 and 27 April. Also, members of the Livestock Producer Association had visited a livestock promotion exhibition in abroad during 15 to 19 March 2002. Although they had no direct contact with the index farm, it is difficult to exclude the possibility of an indirect contact since they live in the same community.

3. Meat and meat products brought by international travelers

The possibility of introduction of FMD by international travelers bringing contaminated meat and meat products was considered and investigated. From January 2002 to August 2002, a total of 4,933 cases of meat and meat products were confiscated from 5,462 cases, which were inspected at airports and seaports. In 2002, 101 cases of confiscated meat and meat products were sampled and tested for FMD virus using PCR. All samples were negative.

4. Yellow sand

Another possible route of introduction was the wind-borne spread of contaminated particles. In 2002, a total of 290 yellow sand samples were collected from across the country during the yellow sand season, and tested for FMDV using PCR. All samples were negative.

5. Swill

Swill feeding was not practiced at the index farm or any neighboring farms. Use of waste garbage from airplanes and ships is prohibited.

6. Others

The possibility of mechanical transmission to the index farm by wild birds and imported sawdust was investigated. However the possibility was determined to be low.

7. Transmission among farms

Epidemiological investigation showed the main route of transmission from the index farm to subsequent farms to be mechanical transmission by people (pharmaceutical companies, artificial insemination, delivery, participation at slaughter etc) and vehicles (feed and sewage trucks, etc.).

The possibility of airborne transmission was considered but was determined to be very low due to rapid diagnosis and slaughter.

The possibility of the mechanical transmission of FMD by wild birds was investigated. Twenty-two pigeons and 48 magpies were captured on the infected farm and tested by VI and PCR for traces of FMDV. All samples were negative. The possibility of transmission was determined to be very low.

There was no evidence of direct transmission by movement of pigs.

- Are infected or exposed animals or premises quarantined? If so, for how long?

Yes, movement restrictions were applied to all animals and animal products within the 10km radius of the outbreak farms in accordance with the Exotic Animal Disease Control Guideline and FMD Emergency SOP. Disinfection was required for all people and vehicles leaving the zones. Movement restrictions were put in place in two designated zones, the protection zone (area within 3km radius of the outbreak farm) and the surveillance zone (area between 3 and 10km radius of the outbreak farm). A total of 131 check points were placed along the border of the restriction zones and were enforced by government employees, the local police and the military around the clock. Some roads were closed entirely and no vehicles or people were allowed through.

Movement restrictions were lifted if no additional outbreaks were reported in the restriction zones for 3 weeks and if extensive clinical and serological surveillance performed after 3 weeks showed no signs of FMD activities.

As of 7 August 2002, all movement restrictions were lifted.

- Are affected premises monitored, and if so, how?

Yes, extensive clinical surveillance of the protection zones and surveillance zones was implemented soon after the first reported outbreak on 2 May 2002 until all movement restrictions were lifted. Clinical inspection was carried out every day on farms suspected as being high of risk or found to be epidemiologically linked.

In addition, farmers inside the movement restriction zones were strongly encouraged to make clinical examinations of their livestock everyday and look for any suspicious signs. Telephone calls were made by the NVRQS to the farmers periodically and their observations were recorded.

-What tests are performed prior to releasing the quarantine?

Extensive serological surveillance of the protection zones and surveillance zones was performed to provide evidence of the freedom from FMD before removing the movement restrictions. Serological surveillance in the outer surveillance zones was carried out three weeks after the last outbreak was diagnosed in the zone, while surveillance in the inner protection zone was carried out after movement restrictions for the surveillance zone was lifted.

Serological surveillance involved the testing of 5,067 animals in the protection zones and 10,842 animals

in the surveillance zones using LPB ELISA as the screening test. Additional tests including virus neutralization test (VN) and 3ABC ELISA were performed on the LPB ELISA positive reactors. Additional serum and Probang samples were then collected from farms which were still showing reactions and tested by VN, PCR and virus isolation (VI). The additional tests indicated that the positive reactions were not due to the presence of FMDV.

Region	Cattle		Pig		Goat		Total	
	Farms	Animals	Farms	Animals	Farms	Animals	Farms	Animals
Protection zone	434	3,949	62	866	42	252	538	5,067
Surveillance zone	1,262	4,836	410	5,542	121	464	1,793	10,842
Total	1,696	8,785	472	6,408	163	716	2,331	15,909

Table 4. Number of animals tested in the outbreak region

- What procedures are used to clean up affected premises?

Cleaning and disinfection procedures on affected farms are listed as followed.

○ Control of the entrance in farm, washing and decontamination

- Personnel : take off the clothing, boots and disinfect using 2% Sodium hydroxide soln. for 10 min. A person leaving the area must shower and not enter again.

- Vehicle : the surface of vehicle should be washed and sprayed with appropriate disinfectant.

○ Decontamination of the infected premises

- What treatment regimes are followed?

After finishing the cleaning up the infected farms, the disinfection should be started.

· Spraying the infected farms in and out → Cleaning up → first disinfection → first evaluation (by official)→secondary disinfection→ final evaluation(by official)

· Using of disinfectant

- soap and detergent

- alkalines : 2% Sodiom hydroxide, 4% Sodium carbonate(animal housing, yards, housing, garbages)

- Acids : 2% Hcl for 10min, 2% Acetic acid, 2% Citric acid for 30min

- Aldehydes : 1-2% Glutaraldehyde, 0.02% Sodium dichloride

- Oxidising agents : 0.175% Sodium hydroxide, 0.02% Sodium dichloride

- What breeding practices are followed?

Breeding practice are performed in accordance with the Exotic Animal Disease Control Guidelines and FMD Emergency Standard Operating Procedures(SOP).

- species and number of sentinel animal

Cattle farm : 2 calves in early age, 3 goats in early age

Pig farm : more than 3 piglets aging 60-70 days on each shed and 5 goats in early age on every farm

- Procedure

1. Owner of affected farm should keep a record of the purchase place, date, transport method and draw up dairy farming documents of sentinel animals.

2. Experimental tests on pig farm **:** 3 piglets are placed in each shed and additionally 5 goats are placed in FMD affected shed.

3. Owner or producer on affected farm should place feedstuff on the ground of the shed

4. The government official should check and keep a record of clinical inspection of sentinel animals at 2 days interval for 2 weeks. After, 2 times a week until 60days.

5. Mayor·county governor should submit the specimen of sentinel animal for the laboratory test.

- If depopulation is used, how are carcasses disposed of(are they salvaged at abattoirs)?

All susceptible animals in infected and neighboring farms within 500m radius were quickly culled and buried. Burial procedures of dead animals were executed according to Act for Prevention of Livestock Disease.

□ Burial standards

○ Preparation

· Burial sites should not be close to riverheads, rivers and streams, roads, and residential areas and it should be possible to limit access by humans and animals to the sites.

· Animals should be buried after it is confirmed that they are dead.

○ Burial

· Dead animals should be buried in the following manner:

· Dig a pit deep enough that the distance between the top of the dead animals and the surface of the surrounding ground is at least 2 meters.

· Cover the floor and sides with vinyl sheet.

· Put adequate amount of dirt on the vinyl-covered floor, and then sprinkle quicklime.

· Put the dead animals in the pit, sprinkle quicklime again, fill the pit with dirt, and pile up dirt at least 1.5 meters high on the filled pit.

· Build drainage ditches and water containment lagoon near burial sites. The ditches should be connected to the lagoon, and the sides of the ditches should be raised so as to prevent the inflow of runoff during and after rainfall.

· When waste and remainders after thermal processing at a rendering establishment are to be buried, comply with the Waste Control Act and the Enforcement Regulations of the Act.

□ Following measures should be taken to prevent the pollution of the surrounding environment:

○ When dead animals are incinerated, bury the bones, ashes, etc. left after incineration at the site or other suitable sites.

○ In the case of burial, use the following procedures:

· If dead animals are exposed even after burial, cover the animals with sawdust, and pile dirt over the animals at least 1.5 meters high.

· Cover the surface with vinyl sheet in case it may rain before the burial site becomes stable.

· Manage leachate with sufficient sawdust.

· Install a U-shaped gas drainage pipe to remove the offensive odor. The tip of the pipe should face the ground surface.

· Apply deodorant chemicals or fermenting agents to burial sites periodically.

Provinces		Cattle		Pig		Goat		Deer		Total	
		Farms	Animals	Farms	Animals	Farms	Animals	Farms	Animals	Farms	Animals
Kyonggi	Anseong	29	1,322	50	79,521	3	27	2	33	84	80,903
	Yongin	2	5	60	50,585	*1	14			62	50,604
	Pyeongtaek			4	4,053					4	4,053
Chungnam	Cheonan			2	13					2	13
Chungbuk	Jincheon	1	45	8	24,536	1	1			10	24,582
Total		32	1,372	124	158,708	4	42	2	33	162	160,155

Table 5. Number of animals culled during the FMD outbreak

- **Is indemnity paid on destroyed?**

Yes, indemnity on destroyed animals was implemented under the Act for Prevention of Livestock Disease, and FMD Emergency SOP. The allowance of indemnity was paid by market value.

- **Have premises, thought to have been cleaned up, later been found to still be affected?**

No. there were no case.

5. The vaccination status of the region. When was the last vaccination? What is the extent of vaccination if it is currently used, and what vaccine is being used?

- Is the ownership and use of vaccine allowed?

The ownership of vaccine is not allowed to the private sector but only to the government. The vaccine is

stored or deployed only by National Veterinary Research and Quarantine Service, Ministry of Agriculture and Forest, Republic of Korea.

- When was the last vaccination?

Prior to the outbreak of 2000, Republic of Korea had been listed as an FMD free country without vaccination. Therefore, no vaccination had been performed before the outbreaks and no regular vaccinations are performed in Korea. Only emergency vaccinations around the outbreak regions were performed during the outbreak in 2000. Total of 860,700 and 661,770 animals have been vaccinated during the first and second round of booster vaccinations, respectively. All vaccinations have been completed in August 2000. There have been no more vaccinations since August 2000.

Since the initial epidemic in March/April 2000, no further outbreaks have been reported in Korea, and the country had applied to the Office International des Epizooties (OIE) for international recognition as an FMD-free country and gained the status of FMD-free in September 2001. But in case of the outbreak in 2002, the disease was eradicated without vaccination and by applying strict control measures to the affected regions. Therefore we were possible to regain the FMD free status at the meetings of the International Animal Health Code Commission and the Foot and Mouth Disease and Other Epizootics Commission held in Brazil on November 2002 by submitting the report on the eradication of FMD in the Republic of Korea.

- What is the extent of vaccination if it is currently used?

The Republic of Korea is currently free of FMD, but in case of an emergency we are keeping 300,000 doses of trivalent vaccines for prompt response and renewing them annually. Furthermore, we have established the national FMD antigen bank in the UK possessing 4,300,000 doses which can be transformed into vaccines and introduced into our country within a week on the request of our government.

- What types of vaccine(live, modified live, killed) are used?

The vaccines used in 2000 were inactivated tivalent(O, A and Asia1) double oil emulsion vaccines satisfying the safety and the potency requirements of European Pharmacopoeia(EP).

- Who may vaccinate(herd owners, veterinarians, etc.)?

Under the control of central and local veterinary authorities, the vaccination was practiced by central or local veterinary officers and veterinary practitioners.

- Are records kept on the use of vaccine?

All vaccinated animals except for soon to be slaughtered-pigs were either ear marked by punching holes (Pig) or branded (Cattle, goat and deer). These animals were registered and maintained by the county offices.

- Who produces the vaccine?

We do not produce our FMD vaccines domestically, but in case of an emergency we are buying 300,000 doses of trivalent vaccines annually from the international major vaccine producing companies. Furthermore, we have established the national FMD antigen bank in the UK possessing 4,300,000 doses which can be transformed into vaccines and introduced into our country within a week on the request of our government.

- Is the administration of serum permitted? If so, by whom and under what conditions?

The administration of serum is not allowed in the Republic of Korea for the FMD control.

6. The degree to which the region is separated from adjacent regions of higher risk through physical or other barriers.

- To what degree is the region separated from regions of higher risk through physical or other barriers?

ROK is mostly surrounded by sea and the only side it shares is its land border with the Democratic People's Republic Korea.

The land border with North Korea is closed which prevents commerce through land.

7. The extent to which movement of animals and animal products is controlled from regions of higher risk, and the level of biosecurity regarding such movements.

- From what countries or regions does the requesting region import products that could potentially carry pest or disease agents of concern?

Certain countries which are not permitted to export relevant items to Korea according to the notification of "Prohibited Region for Exporting Relevant Items" may request Korea to accept its products. But only permitted countries or regions can export relevant items.

1. animals

Category	Prohibited Region
A. Cloven-Hoofed Animals(except Ruminants)	Other countries but U.S.A, Canada, Australia, New Zealand, Japan, Denmark, Sweden, Finland, Great Britain and France.
B. Ruminants	Other countries but Australia and New Zealand
C. Poultry(including pet birds and wild birds). on-day old poultry . hatchery eggs . table eggs	Other countries but Australia, New Zealand, Taiwan, Germany, U.S.A, Canada, France and Denmark
D. Ostrich(including one-day ostrich and hatchery egges)	Other countries but Australia, New Zealand, Canada, France and Denmark.

2. Meats (including meat products)

Category	Prohibited Region
A. Beef	Other countries but Australia, New Zealand, Mexico and U.S.A
B. Pork	Other countries but U.S.A, Canada, Australia, New Zealand, Japan, Sweden, Denmark, Finland, Austria, Hungary, Poland, Belgium, Mexico, Chile, Great Britain, Netherlands, Spain, Ireland, France and Slovakia
C. Goat meat, mutton	Other countries but Australia and New Zealand.
D. Venison	Other countries but Australia and New Zealand.
E. Poultry meat	○Fresh poultry meat : Other countries but Taiwan, Australia, Brazil, U.S.A, Canada, France, Chile and Denmark. ○Heated poultry meat : Other countries but Taiwan, Australia, Brazil, U.S.A, Thailand, China, Canada, France, Chile and Denmark.
F. Ostrich meat	Other countries but New Zealand
G. Kangaroo meat	Other countries but Australia
H. Boiled Beef	Other countries but Australia, New Zealand, Mexico, Argentina and Uruguay.

3. animal products but meats

Category	Prohibited Region
A. Raw hide from cloven-hoofed animals	Other countries but New Zealand, Denmark, Latvia, Lituania, Mexico, U.S.A, Sweden, Ukraina, Estonia, Japan, Canada, Finland, Australia, Netherlands, Belgium, Germany and Itly.
B. Raw Milk	Other countries but U.S.A, Canada, Australia, New Zealand, Japan, Denmark, Sweden and Finland.

C. Bovine Semen	Other countries but U.S.A, Canada, Australia and New Zealand.
D. Bovine Fertilized Egg	Other countries but Australia, New Zealand and Canada.
E. Caprine and Ovine Semen	Other countries but Australia
F. Deer Semen and Deer Products	Other countries but Australia(excluding semen) and New Zealand.
G. BSE Items - Bones.horns and etc. of ruminants(excluding hide and milk) - Animal originated protein products : Meat and Bone Meal.Meat Meat.Bone Meal.Hoof Meal.Dried Plasma.Horn Meal.Other Blood Products. Hydrolysed Protein.Poultry Offal Meal.Feather Meal.Greaves.Fish Meal.Dicalcium Phosphate. Gelatine and Mixture(Feed, Additives or Primixture etc. including above items)	Greece, Netherlands, Denmark, Germany, Luxemburg, Belgium, Spain, Ireland, Great Britain, Italy, Portugal, France, Norway, Rumania, Macedonia, Bosnia, Bulgaria, Slovakia, Slovenia, Albania, Yugo, Croatia, Poland, Hungary, Austria, Sweden, Finland, Swiss, Liechtenstein, Czech, Japan, Canada, Israel, U.S.A(34 countries)

※ Those which are excluded from BSE Items

- Fish Meal produced in exclusive fish meal facilities.
- Retail packaged pet feed which do not contain ruminant protein.
- Beef tallow which insoluble impurities are less than 0.15%
- Bovine fetal-serum
- Porcine plasma produced in an accredited exclusive facility
- Bovine Fertilized Egg collected and handled according to the standards of International Embryo Transfer Society
- Gelatine and Collagen derived from raw hide and leather
- Dicalcium Phosphate which does not contain protein and fat
- Hydrolyzed Protein derived from poultry liver or heart
- Non-ruminant derived Whole Blood, Serum, Plasma and it's albumin or globulin for use of laboratory and biological medicine manufacture

Table 6. Notification of "Prohibited Region for Exporting Relevant Items"

- To what extent is the movement of such products controlled from regions of higher risk, and what is the level of biosecurity regarding such movements?

According to the article 32(Prohibition of import) of Act on the Prevention of Contagious

Animal Disease, any product which is produced, shipped or has passed the prohibited area can not be imported. Exceptionally, the products which were moisture-heated at 121°C for 15~20 minutes or at 115°C for 35minutes, or dry-heated at 160~170°C for 1~2 hours, or processed in another way which has the same effect to sterilize contagious disease agents and packed to prevent recontamination, can be kept, stored or distributed in room temperature are excluded. And the product should be certified the sterilization through one of these three ways; 1. Certificate issued by veterinary authorities in exporting country; 2. Heat treatment certificate or processing certificate issued by the government of exporting country; 3. Sterilization certificate signed by exporting company and confirmed by an endorsement authority.

- What test procedures are used?

For non-consumption : documentary examination

For consumption : Germ developing test

- Are animals that may carry the disease agents quarantined? If so, for how long and where?

Exported cloven-hoofed animals shall be quarantined for 15days according to the Appendix 8 of the Enforcement Rule of the Act on the Prevention of Contagious Animal Disease.

It is provisioned in Article 35(Prior Notification of Animal Imports) of the Act on the Prevention of Contagious Animal Disease and the article 36(Prior Notification , etc. of Animal Imports)of the Enforcement Rule of the Act on the Prevention of Contagious Animal Disease that any person who is to have the imported items to undergo quarantine inspection shall summit to the head of the National Veterinary Research and Quarantine Service(NVRQS) the Application describing the kind of animal, numbers, date, provisional imported place and so forth.

It is provisioned in article 42(Quarantine Inspection Facility) of the Act on Prevention of Contagious Animal Disease that quarantine inspection shall be carried out at the quarantine inspection facility of the NVRQS. In case it is deemed impracticable or improper to carry out a quarantine inspection of certain items at the quarantine inspection facility of NVRQS, quarantine inspection may be conducted at a place other than the quarantine inspection facility of NVRQS when the place is equipped and given every facility for quarantine inspection.

- Are import permits and health certificates required?

It is provisioned in Article 35(Prior Notification of Animal Imports) of the Act on the Prevention of Contagious Animal Disease and the article 36(Prior Notification , etc. of

Animal Imports)of the Enforcement Rule of the Act on the Prevention of Contagious Animal Disease that any person who is to have the imported items undergo quarantine inspection shall summit to the head of the National Veterinary Research and Quarantine Service(NVRQS) the Application described the kind of animal, numbers, date, provisional imported place and so forth. And the health certificate that corresponds with the Import Health Requirement shall be attached.

Ex) Import Health Certificate Formula for New Zealand Cattle

ZOOSANITARY CERTIFICATE

Species: CATTLE
To: THE REPUBLIC OF KOREA

Import Permit Number: .....

Exporting Country: NEW ZEALAND
Competent Authority: Ministry of Agriculture and Forestry

I IDENTIFICATION OF ANIMALS

Identification				
Permanent	Temporary	Sex	Age	Breed

Total number of animals.....

II: SOURCE OF ANIMALS

Name and address of exporter: .....

.....

Address of export farms: .....

.....

Name and address of isolation facility: .....

.....

Date of entry into the isolation facility: .....

Completion date of isolation period: .....

III: DESTINATION OF ANIMALS

Name and address of importer:.....

.....

Means of transport (including date of shipment, name/number of flight/vessel and port of shipment): .....

.....

IV: TESTING **Laboratory information provided**

Name of testing laboratory: .....

V: SANITARY INFORMATION

VETERINARY CERTIFICATION

I, ..., an official veterinarian of the New Zealand Ministry of Agriculture and Forestry certify, after due enquiry, in regard to the animals listed in this Zoosanitary Certificate, that:

1. Country freedom

1.1 New Zealand has been free from foot and mouth disease, vesicular stomatitis, bluetongue and swine vesicular disease for 2 years, and rinderpest, contagious bovine pleuropneumonia, peste des petits ruminants, lumpy skin disease, Rift Valley fever, sheep and goat pox and African swine fever for the last 3 years, and bovine spongiform encephalopathy for the last 5 years.

Vaccination against these diseases is not permitted in New Zealand.

1.2 New Zealand has been free from *Brucella suis*, porcine reproductive respiratory syndrome, hog cholera, Teschen disease of swine, transmissible gastro-enteritis, maedi-visna, enzootic abortion of sheep and goats, *Anaplasma marginale*, *Babesia bigemina*, *Babesia bovis*, anthrax, bovine brucellosis (*Brucella abortus*), Q fever, rabies and haemorrhagic septicaemia for 2 years, and scrapie for 5 years.

Vaccination against these diseases is not permitted in New Zealand.

1.3 New Zealand has been free from Aujeszky's disease, *Brucella melitensis*, *Leptospira canicola*, *L icterohaemorrhagiae*, *Theileria annulata* and *Theileria parva* for the last 5 years.

Vaccination against these diseases is not permitted in New Zealand.

2. Residency and farm of origin

2.1 The cattle for export were born and raised in New Zealand or have been resident in New Zealand for at least 6 months prior to the scheduled date of entering pre-export isolation.

2.2 The cattle originate from farms that have not had confirmed diagnoses using clinical, serological or pathological evidence of the following diseases for the period indicated:

2.2.1 Johne's disease for 5 (five) years
2.2.2 bovine tuberculosis for 2 (two) years
2.2.3 trichomoniasis for 1 (one) year
2.2.4 leptospirosis and bovine genital campylobacteriosis, and infectious bovine rhinotracheitis/infectious pustular vulvovaginitis for 6 (six) months.

3. Vaccination and on-farm testing

3.1 The cattle were tested for bovine tuberculosis using an intradermal tuberculin test between 60 (sixty) and 90 (ninety) days before scheduled date of shipment.

Date of test:.....
Name of testing organisation:.....

3.2 The cattle were vaccinated against infectious bovine rhinotracheitis/infectious pustular vulvovaginitis twice, approximately 30 (thirty) days apart, between 10 (ten) and 60 (sixty) days before the scheduled date of shipment.

Dates of vaccination: .....
Name of product: .....
Batch details: .....

3.3 The cattle were tested twice with negative results for enzootic bovine leucosis using either an ELISA or AGID test. The tests were conducted at approximately a four (4) month interval prior to the scheduled date of export, with the final test being conducted during the pre-export isolation period.

Dates of test: .....
Test used: .....

Pre-export testing and isolation

4.1 The cattle for export were isolated on premises approved by the Ministry of Agriculture and Forestry for a period of at least 30 (thirty) days prior to the scheduled date of shipment. During this period they were inspected by an official veterinarian and were kept separate from other animals not of the same health status.

Date of inspection: .....

4.2 During pre-export isolation the cattle were subjected to tests for the following diseases with negative results. Laboratory information provided.

4.2.2 Johne's disease using:

Either: 4.2.2.1 a complement fixation test

Or: 4.2.2.2 an ELISA

Date of test: .....

(Delete whichever is not applicable)

4.2.3 leptospirosis (*L pomona, L tarassovi*) using:

Either: 4.2.3.1 the microscopic agglutination test

Or: 4.2.3.2 the cattle are to be given either an injection of long acting tetracycline (20 mg/kg) or dihydrostreptomycin (25 mg/kg) twice at an interval of 14 days. The second injection of dihydrostreptomycin is to be carried out within 3 (three) days of the scheduled date of shipment.

Date of test/ Date(s) of treatments: .....

(Delete which ever is not applicable)

4.3 The cattle were determined to be free of bovine genital campylobacteriosis by one of the following means:

Either: 4.3.1 virgin heifers mated to virgin bulls or bulls tested free of genital campylobacteriosis

Or: 4.3.2 virgin heifers were inseminated with semen uncontaminated with genital campylobacteriosis

Or: 4.3.3 for cows that have been mated previously, the culture of vaginal mucus for the presence of the causal agent of bovine genital campylobacteriosis were negative

Or: 4.3.4 the animals for export are virgin animals.

(Delete whichever is not applicable)

4.4 The cattle were determined to be free of trichomoniasis by one of the following means:

Either: 4.4.1 virgin heifers mated to virgin bulls or bulls tested free of trichomoniasis

Or: 4.4.2 virgin heifers were inseminated with semen uncontaminated with trichomoniasis

Or: 4.4.3 for animals that have been mated previously, direct microscopic examination and culture of vaginal mucus were negative

Or: 4.4.4 the animals for export are virgin animals.

(Delete whichever is not applicable)

5. Treatment

5.1 The cattle for export were treated for ectoparasites and ticks within seven (7) days prior to the scheduled date of departure.

Name of product: .....

Active ingredients: .....

Date of treatment: .....

Treatment method: .....

Number of times treated: .....

6. Final inspection

6.1 Within 72 hours of the scheduled date of export the animals were examined by an Official Veterinarian and were found to be clinically healthy and free from bovine malignant catarrhal fever and blackleg. The cattle were considered fit to travel.

Date of inspection: .....

7. Transport

7.1 The vehicles used to transport the cattle to the port of embarkation and the pens or containers used to transport the cattle to the Republic of Korea were cleaned and disinfected using a product approved by Ministry of Agriculture and Forestry.

Name of product: .....

Date of treatment: .....

Concentration used: .....

7.2 All fodder, bedding and other materials supplied at the port of embarkation were sanitary, uncontaminated with an OIE List A or B disease and were from the same source as those used prior to export during the pre-export isolation.

.....

Signature Official Veterinarian — Official stamp and date
New Zealand Ministry of Agriculture and Forestry

.....

.....

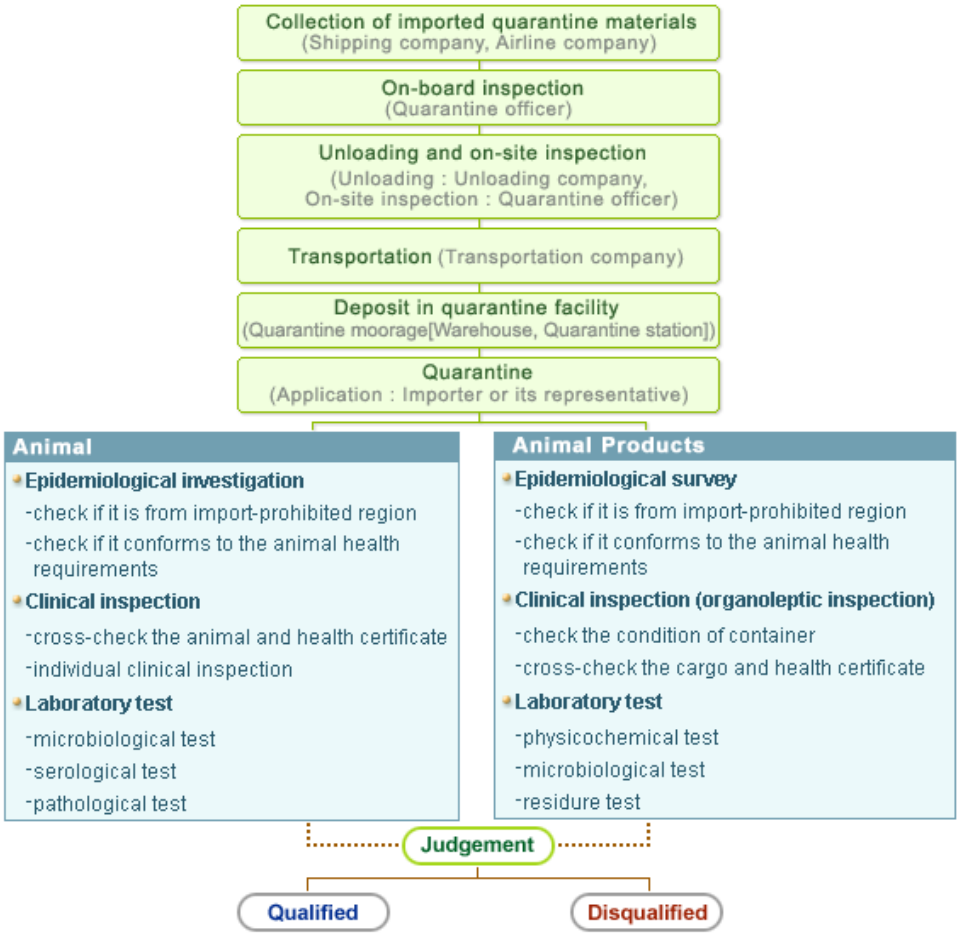
.....

Name and address of office

NOTE: All pages are to be endorsed with the Official Stamp.

- What other procedures are used?

Quarantine and Inspection Procedure



8. Livestock demographics and marketing practices in the region

- How many herds, flocks, etc, of each relevant species are in the region?

The total number of cattle in Korea amounted to 2,503,850 heads in March 2007. The total number of pigs in March 2007 reached 9.3 million.

Table 7. Number of livestock

Year	Livestock		
	Cattle	Pigs	Chicken
	1,000 Head		
2001	1,954	8,720	102,393
2002	1,944	8,974	101,693
2003	1,999	9,230	99,018
2004	2,163	8908	106,736
2005	2298	8962	109,628
2006	2484	9382	119,181
2007.3	2504	9345	126,257

- **How are they distributed (e.g. herd density ,etc)?**

The majority of cattle producers in Korea run small and medium-sized farms with 1-100 heads of cattle.

Table 8. Number of animals classified by herd density.

unit :1000 head

year	Cattle				
	1-19	20-49	50-99	More than 100	total
2004	720	548	512	383	2,163
2005	788	576	544	390	2,298
2006	833	611	583	456	2,484
2007.3	832	611	585	476	2,504

year	Pig				
	1-999	1,000-4,999	5,000-9,999	More than 10,000	total
2004	2,197	5,018	852	840	8,908
2005	1,985	5,185	883	908	8,962
2006	1,879	5,406	1,105	992	9,382
2007.3	1,792	5,482	1,042	1,028	9,345

year	Chicken				
	Less than 10,000	10,000-29,999	30,000-49,999	More than 50,000	total
2004	6,396	23,746	29,447	47,046	106,736
2005	6,243	22,547	32,509	48,329	109,628

2006	4,304	25,882	32,599	56,395	119,181
2007.3	4,377	26,060	34,761	61,058	126,257

- **Where are the major livestock marketing centers?**

Livestock markets are set up and operated by livestock cooperatives established pursuant to the Agricultural Cooperatives Act. The number of livestock markets in Korea is 79 and the calf auction market is 46 in 2006 . The Major livestock markets are listed below.

Table 9. Major livestock markets in Korea(2006 yr)

Species	Province	Market place	Head of transaction
calf	Gyeongnam	Geochang-gun	10,902
		Changyong-gun	9,665
	Gyeongbuk	Yecheon-gun	7,737
		Youngju-gun	6,373
	Chungnam	Seosan-city	6,290
		Cheongyang-gun	6,001
Native cattle	Gyeongnam	Geochang-gun	12,297
		Changyong-gun	13,847
	Gyeongbuk	Angang-eup	9,580
		Yonggung-eup	9,294
	Chungnam	Nonsan-city	12,311
		Gwangcheun-eup	11,874
		Hongseong-gun	9,430
Dairy cow	Kyunggi	Anseong -city	5,648
		Suwon-city	8,232

- **What are the patterns of livestock movement within the region?**

Generally, the patterns of livestock movement within Korea are classified into 3 types which are farm to farm movement, livestock market(or auction) movement and movement by livestock middlemen.

- **How are the animals transported and handled during market transactions?**

When live cattle are transported, an average of 8 heads of cattles are loaded on a truck. While 30-35 heads of swine are loaded on a 2.5- 5.0 ton truck. At that time, the handling of animals is careful and animal welfare is considered humanely.

9. The type and extent of disease surveillance in the region. (is it passive and/or active, and what is the quantity and quality of sampling and testing?

In the Republic of Korea, surveillance activity consists of passive epidemiological surveillance system which investigates reported disease activities, and active epidemiological surveillance system which examines statistically selected and targeted samples within host populations. Any suspicious case of FMD is followed by quarantine, confirmatory diagnostic tests, and other necessary control measures.

The purpose of the FMD surveillance is to:

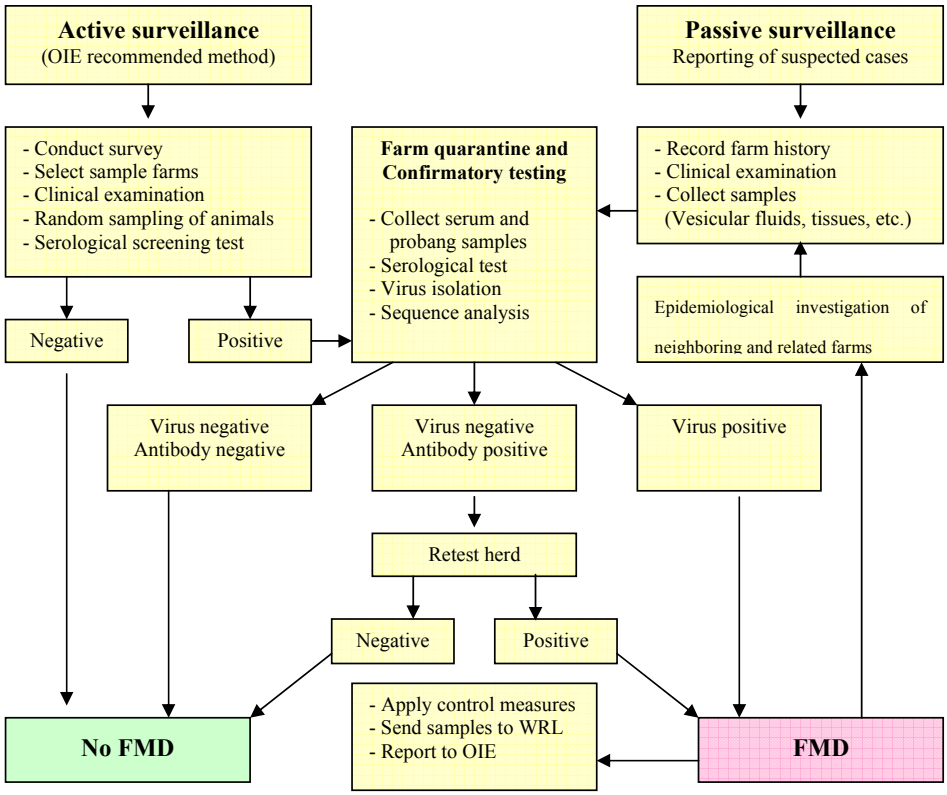
· Define the current disease status of the country;

· Maintain an effective system to detect disease activity and contain the disease;

· Identify possible primary index and/or other high-risk farms;

· Provide sufficient evidence that the country is free from FMD by demonstrating an effective level of surveillance which has been performed

Fig 2. FMD surveillance in Korea



- Are serum surveys conducted, and if so, how frequently, what sample sizes are used, and what has been found?

Statistically designed serological surveillance and purposive serological surveillance is conducted through out the year.

The statistically designed serological surveillance uses stratified two stage sampling strategy to select samples from the cattle, goat and pig population using ELISA as the screening test.

Annual sample size was calculated to provide 99% probability of detecting evidence of FMD if it is present at a prevalence of 1% among herds and 20% within infected herds for cattle, 29% for goats and 50% for pigs. Calculation of the required sample size was performed according to the method proposed by Garner, M. G. et al. (1997).

The required sample size was calculated using the following parameters:

- Required level of confidence: 99%
- Expected infected herd prevalence: 1%
- Expected within infected herd prevalence: 20% (Cattle), 29% (Goats), 50% (Pigs)
- Test sensitivity: 95% (ELISA)
- Test specificity: 100% (ELISA)
- Number of samples per farm: 4 (Cattle, Goats), 8 (Pigs)

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Serological surveillance in 2002

Between March to December 2002, Totals of 4,464 cattle from 1,083 farms, 3,956 pigs from 483 farms and 2,573 goats from 637,farms and have been tested as part of the statistically designed serological surveillance.

Total of 32 serum samples from 15 farms showed reaction to the LPB ELISA screening test. Of these positive reactors, 5 samples from 3 farms were found to be from vaccinated livestock. These samples were tested using the 3ABC ELISA test and were negative for FMD. The rest of the samples were tested by VN and 4 samples from 4 farms showed reaction to the test. Total of 41 additional samples from these 4 farms were collected and tested. No reactions were detected from these additional samples. Additional tests (LPB ELISA, VN, 3ABC ELISA) performed on the positive reactors indicated that they were not FMD positive cases.

Purposive serological surveillance was performed to look for the presence of disease in high-risk areas and situations.

This included farms that had indirect contact with an infected farm in 2002. In addition, purposive surveillance of susceptible animals, which were not included in the statistically designed survey such as wild animals, nationwide slaughterhouse surveillance has been performed to supplement the statistically designed survey.

Trace-back and trace–forward investigations were undertaken during the outbreak period to identify farms that had indirect contact with an infected farm. A list of these farms was prepared and livestock in the premises were serologically tested using ELISA. All samples were negative for FMD.

Table 10. Number of samples tested

Area	Cattle		Pigs		Total	
	Farms	Animals	Farms	Animals	Farms	Animals
Kyonggi	68	682	130	1,831	198	2,513
Kangwon	4	56	1	14	5	70
Chungbuk	13	211	10	140	23	351
Chungnam	18	229	20	280	38	509
Total	103	1,178	161	2,265	264	3,443

Between 2001 and September 2002, a total of 67 wild boar and 27 wild water deer serum samples were acquired and tested using LPB-ELISA. All samples were negative for FMD.

A nationwide slaughterhouse surveillance was implemented to supplement the statistically designed serological surveillance. From April to October 2002, a total of 1,642 samples were tested using LPB ELISA. All samples were negative for FMD.

From August to October 2002, after the 2002 outbreak period, a total of 20,797 additional serum samples were collected from slaughterhouses. These samples were tested using the pen-side antibody test, which is a solid-phase immunochromatographic assay that can differentiate the infected animal from the vaccinated animal using the 2C and 3ABC protein for capturing specific antibodies in the test sample. Totals of 2,156, 18,625 and 16 samples from cattle, pigs and goats were tested, respectively. A total of 1,343 samples were positive to the pen-side antibody test. These were retested using the LPB ELISA and were negative for FMD.

Farmers wishing to certify that their livestock is not infected with FMD can apply to have their livestock tested by a government laboratory. In 2002, 4,983 samples from 1,019 farms were tested using LPB ELISA as part of the certification tests. A total of 16 samples from 11 farms showed reaction to the LPB ELISA and were retested using VN test. One farm showed reaction to the VN test and 12 additional samples were acquired and tested using LPB ELISA and VN. However, no reactions were detected from these samples.

In addition to the regular statistically designed and purposive surveillance, extensive serological surveillance of the protection zones and surveillance zones was performed to provide evidence of freedom from FMD before removing the movement restrictions. Serological surveillance in the outer surveillance zones was carried out three weeks after the last outbreak was diagnosed in the zone, while surveillance in the inner protection zone was carried out after movement restrictions for the surveillance zone was lifted.

Serological surveillance involved the testing of 5,067 animals in the protection zones and

10,842 animals in the surveillance zones using LPB ELISA as the screening test. Additional tests including virus neutralization test (VN) and 3ABC ELISA were performed on the LPB ELISA positive reactors. Additional serum and Probang samples were then collected from farms still showing reaction and tested by VN, PCR and virus isolation (VI). The additional tests indicated that the positive reactions were not due to the presence of FMDV.

Table 11. Number of animals tested in the outbreak region in 2002.

Region	Cattle		Pig		Goat		Total	
	Farms	Animals	Farms	Animals	Farms	Animals	Farms	Animals
Protection zone	434	3,949	62	866	42	252	538	5,067
Surveillance zone	1,262	4,836	410	5,542	121	464	1,793	10,842
Total	1,696	8,785	472	6,408	163	716	2,331	15,909

Table 12. Animals tested in serological surveillance from 2003 to 2006

	2003		2004		2005		2006	
Method	Farms	Animals	Farms	Animals	Farms	Animals	Farms	Animals
ELISA Statistical	2,200	11,700	2,261	12,180	2,287	11,647	1,951	9,655
ELISA Purposive	2,384	12,929	1,924	12,952	2,310	13,781	2,671	15,630
Penside Slaughterhoouse	11,757	80,604	9,826	61,136	11,543	65,848	9,109	55,754
Peside Breeding farm	455	17,605	560	20,791	663	25,432	665	23,516
Total	16,796	122,838	14,571	107,059	16,803	116,708	14,396	104,555

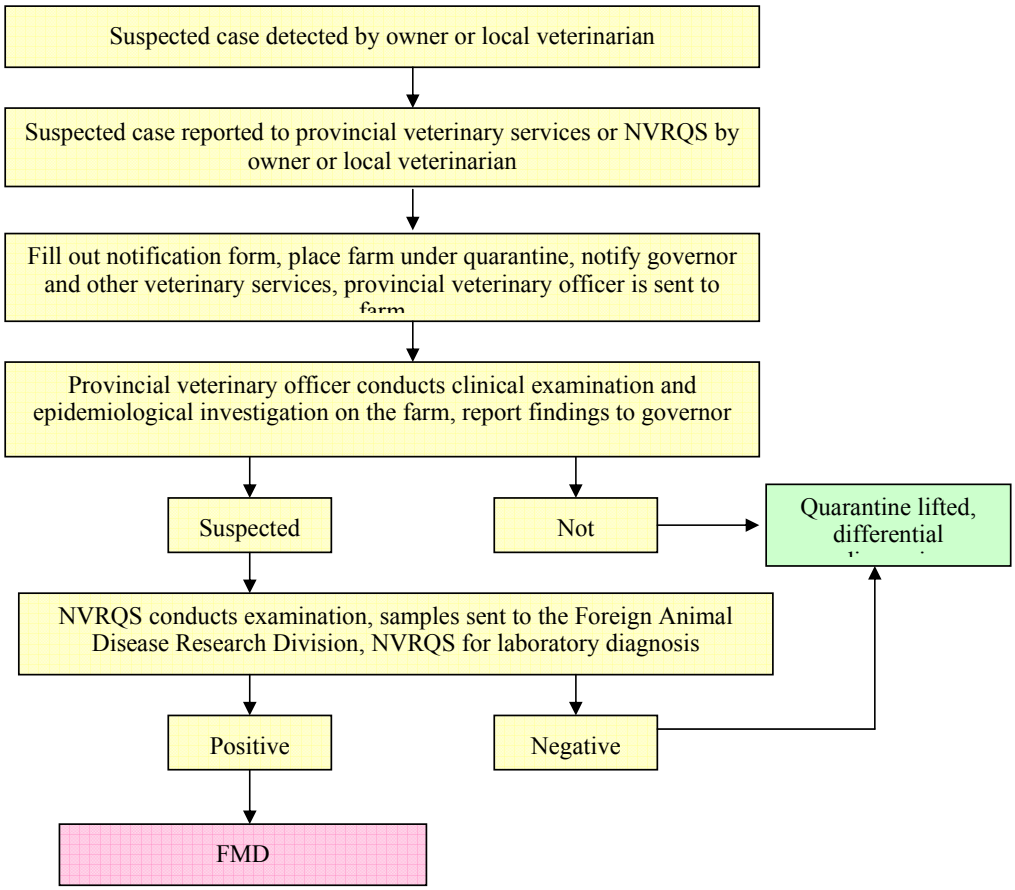
From the seroserveillance carried out on a number of serum samples during the last four years (Table 9.3), no FMD positive case was found in the Republic of Korea with all the suspected serum positive responses in screening stage proven negative by the confirmatory tests.

- Is reporting of sick animals mandatory, and if so, what is the procedure (by whom and to whom) and what penalties are involved for failure to report?

By the Act for the Prevention of Livestock Epidemics, livestock owners or veterinarians must notify any FMD suspicious cases to the city or county veterinary services. If necessary, MAF and NVRQS are then to be notified. Notification and investigation procedures are outlined in the Exotic Animal Disease Control Guidelines.

Failure to notify promptly will result in loss of compensation and if deemed necessary, criminal charges against the livestock owner.

Fig 3. Notification and investigation procedures for FMD in Korea.



- Are laboratory tests run on suspicious animals? If so, what procedures and to what extent (what proportion of suspicious cases are evaluated using each of the specific laboratory testing)

Laboratory tests for suspect cases are performed at FADRD, NVRQS. Samples such as vesicular fluids, epithelial tissues, saliva and blood from clinically suspected livestock and surrounding livestock are acquired and sent directly to FADRD for testing. Laboratory tests include viral antigen detection by Ag ELISA, RT-PCR, DNA sequencing and virus isolation, and antibody detection by LPB ELISA, 3AB ELISA and VN test, as specified in the FMD diagnostic method of OIE.

Table 13. The number of suspected cases reported to NVRQS in 2002.

Province	Cattle	Pigs	Goats	Deer	Total
Kyonggi	8 (1) *	19(13) *			27 (14) *
Kangwon					
Chungbuk	1	4(2) *			5 (2) *
Chungnam	1	1			2
Chonbuk	1				1
Chonnam					
Kyongbuk					
Kyongnam					
Cheju					
Total	11 (1) *	24(15) *			35 (16) *

* The numbers in the brackets are number of FMD positive cases.

Table 14. Diagnosis of suspected cases reported to NVRQS in 2002.

Diagnosis	Cattle	Pigs	Goats	Deer	Total
FMD	1	15			16
BVD	2				2
Pappilloma	4				4
Trauma	1	9			10
Dyspepsia	1				1
Epidermititis	2				2
Total	11	24			35

- Are quarantine imposed on premises with suspicious cases, pending final diagnosis?

Farms with suspicious cases are placed under quarantine, according to the Exotic Animal Disease Control Guidelines and FMD control guidelines pending final diagnosis.

- What other procedures are followed regarding suspicious cases?

Exotic Animal Disease Control Guidelines and FMD control guidelines describe the necessary procedures.

10. Diagnostic laboratory capabilities

- What diagnostic laboratory capabilities are there?

FMD diagnosis is made at the Foreign Animal Disease Research Division (FADRD) of the National Veterinary Research and Quarantine Service (NVRQS), which operates an enhanced BL3 laboratory.

At present, total of 9 provincial Veterinary laboratories (one for each province) are performing NSP ELISA for serological screening tests as part of the National FMD surveillance program. However, final diagnosis for FMD is made at FADRD, NVRQS.

The following tests were used to diagnose FMD during the 2000 and 2002 outbreaks.

Table 15. Tests employed to diagnose FMD in Korea

	Test	Method
Antibody test	Liquid Phase Blocking (LPB) ELISA	WRL Pirbright UK
	3ABC ELISA	FADDL USA, Brecia Italy
	Virus Neutralization test	Using IBRS-2 cells
Antigen test	Virus Isolation test	Using black goat fetal lung (BGFL) primary cell culture, IBRS-2, BHK-21
	RT-PCR	Using primers for 3ABC and VP1 region
	Antigen ELISA	WRL Pirbright UK
	Penside kit	Viral antigen detction kit

- Are there laboratories approved for agent isolation, identification and typing.

Foreign Animal Disease Research Division (FADRD) of the NVRQS, operates an enhanced BL3 laboratory. FMD virus isolation, identification and typing are performed only within this facility. FADRD, NVRQS is located at 480 Anyang 6 dong, Manangu, Anyang city, Kyonggi Province, Republic of Korea.

- What security measures are in place in laboratories within the region to prevent escape of biological agents?

Only FADRD, NVRQS is authorized to handle FMD viruses, and only within the BL3 laboratory. No other laboratory in Korea handles FMDV.

- What kind of training have the diagnostic personnel had regarding the specific disease agent of concern?

The diagnostic personnel are veterinarians or veterinary scientists and have been trained within the laboratory. FADRD, NVRQS has also had close ties with Pirbright Laboartory(UK) and Plum Island Animal Disease Center(USA) in cooperative research areas on FMD and exchange of research scientists.

11. Policies and infrastructure for animal disease control in the region, i.e, emergency response capacity.

- What policies and infrastructure exist for emergency response to outbreak situations?

Policy(emergency, plans, funds)

Korean Animal Authority has immediately taken control measures according to the related regulations ; Act for the Prevention of Domestic Animal Diseases, Directive for FMD control guideline, FMD emergency control guideline(SOP)" and "Manual of animal disease(NSA)".

FMD Emergency Control Guidelines, a detailed manual describing the standard operating procedures during an FMD emergency, were used extensively during the 2002 FMD outbreak.
In the event of an FMD outbreak, major government organizations are to be involved in the effort to eradicate the disease as specified in the FMD emergency SOP and related guidelines.
The necessary disease control and preventive measures such as notification of suspicious cases, stamping-out, movement controls, disinfection, vaccination, surveillance, importation quarantine, disposal, compensation, and penal provisions
Annual contingency exercises are held every year to test these emergency operating procedures and the readiness of the veterinary services in a simulated outbreak.
Livestock industry development fund is used in the event of major livestock disease outbreaks such as an FMD for such purposes as enforcement of preventive measures, government buy-out programme and compensations for slaughtering infected animals and related animals.

Infrastructures

In the event of an FMD outbreak, major government organizations are to be involved in the effort to eradicate the disease as specified in the FMD emergency SOP and related guidelines.

· Ministry of Agriculture and Forestry: establishment of emergency headquarters, organization and implementation of emergency control measures, budgetary allocations, press reports.
· National Veterinary Research and Quarantine Service: diagnosis, epidemiological investigation, surveillance, vaccine import/management/distribution, technical support and education
· Provincial Animal Health Authority: clinical diagnosis, implementation of control measures such as disinfection and movement restrictions
· Ministry of Information and Communication: communication and public awareness campaign
· Ministry of National Defense: enforcement of movement restrictions and stamping out
· National Police Agency: enforcement of movement restrictions
· National Maritime Police Agency: prevention of illegal entry of livestock and livestock products
· Korea Customs Service: prevention of illegal entry of livestock and livestock products

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